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Title

Visible Infra-Red Thermal Imaging Spectrometer (VIRTIS)
Recurrent Instrument Review R.I.D.'s
Set 1

	Name and Function	Date	Signature
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SUMMARY

This document presents the current set of Review Item Discrepancies (or RID's) on the Visible Infra-Red Thermal Imaging Spectrometer (VIRTIS) data package that have jointly been developed by ESA and ASTRIUM in the context of the VIRTIS Recurrent Instrument Review (RIR).

An overview of the RID's may be found within the Table of Contents (pages iii to iv) which gives all RID Titles (MAJOR RID's in capital, Minor ones in small letters).

Document controlled by :

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1. SCOPE

This document presents the current set of Review Item Discrepancies (or RID's) on the Visible Infra-Red Thermal Imaging Spectrometer (VIRTIS) data package that have jointly been developed by ESA and ASTRIUM in the context of this instrument Recurrent Instrument Review (RIR).

An overview of the RID's may be found within the Table of Contents (pages iii to iv) which gives all RID Titles (MAJOR RID's in capital, Minor ones in small letters).

Let us recall here that the objectives of the RIR review are as follows :

- To approve the overall EM/QM/FM/PFM designs, including a thorough verification of the physical interfaces (and overall technical budgets);
- To approve the qualification and acceptance programmes (in particular as their detailed definition and related schedule are concerned), to be detailed as presented in annex 4 of document VEX.TN.0144/T/ASTR.
- To make a complete check of all (on-ground, for AIT / in-flight) operation schemes via a thorough examination of system AIT and user manuals (as extracted from the PID-A, their definition is recalled within the annexes 2 and 3 of the document VEX.TN.0144/T/ASTR).

2. VIRTIS R.I.R. R.I.D.'S

The various Review Item Discrepancies (RID's) are joined hereafter, and classified according to the following domains :

Domain	Domain ID	MAJOR	Minor
Management	MGT	6	2
Development, AIV and Schedule	DEV	4	1
Product Assurance	QPA	6	2
System / Mission Design	SYS	6	0
Science Performances	SCI	0	0
Mechanical and Thermal	MTH	1	0
AOCS	AOC	0	0
Electrical and EMC	ELC	8	0
Operations and Software	OPS	8	7
TOTAL		**39**	**12**

2.1. MANAGEMENT

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Experiment Management Plan Reference of Document : none	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Pargraph 7.6.3 p27	Importance : MAJOR
Synthesis of the Comment : **DOCUMENTATION FOR RIR DATA PACKAGE.**	RID Identification : Reviewer ID : EB 1 Domain ID : MGT
Reviewer Comment or Question : "The PI accepts to deliver to Astrium/ ESA all the documentation needed for the project in agreement to the data package requested, still TBC." As requested by the PID-A, the following documents shall be provided specifically for VEX program : Ø The full compliance matrix with regards to VEX = MEX PID-A applicable document; Ø The Design, Development and Verification Plan (DDVP) relating to VEX program; Ø The ROSETTA mathematical models updated with regards to VEX interfaces (mechanical and thermal interfaces in particular due to the specific VEX support bracket). Ø The VEX Flight User Manual, Ø The VEX AIT User Manual, Ø The VEX TM/TC data base	Reviewer Recommendation : The compliance matrix, DDVP and mathematical models available today are the ROSETTA ones. Please, would you provide them with regards to VEX program.
P.I. or E.M. Answer : 1. compliance matrix to MEX PID-A: merge with RID EB9-QPA 2. DDVP relating to VEX: merge with RID EB6-DEV; 3. ROSETTA mathematical models updated with regards to VEX interfaces: merge with RID EB6-DEV 4. VEX Flight User Manual: to be provided as soon as VEX mission Flight Ops will be clearly identified 5. VEX AIT User Manual: will be provided as soon as VEX mission on ground Ops will be clearly identified 6. VEX TM/TC data base: see above points 4 and 5.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION

	Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Experiment Management Plan Reference of Document : None	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Figure 7-4-4-1 – Virtis master Schedule	Importance : MAJOR
Synthesis of the Comment : **UPDATED SCHEDULE FULLY COMPATIBLE OF PARTNERSHIP AGREEMENT REQUIREMENT TO BE PROVIDED**	RID Identification : Reviewer ID : EB 2 Domain ID : MGT
Reviewer Comment or Question : Agreed delivery dates are recalled and underlined to be compared to the dates provided in the schedule of the management plan (which are not underlined) : Structural dummies :15/11/2002 (from ROSETTA) -> 31/01/2003 EM : 1/06/2003 -> 30/06/2003 FM : 2/01/2004 (available from ROSETTA, to include 3 months contingency) -> 26/05/2004 FS : with FM (definition TBD) / None Moreover, schedule provided at kick-off is as follows: V-M,V-H & ME ass & test calibration (spare parts available): 30/06/2003 PFM availability after calibration : 30/01/2004	Reviewer Recommendation : Please, would you provide an updated schedule in accordance with the partnership agreement requirements, by identifying the different delivered models.
P.I. or E.M. Answer : VIRTIS delivery dates are compatible with the schedule which we provided in the RIR data package and they are not much pessimistic. The schedule provided at the KOM was not updated since June 2002 as you can see in such graph looking at the KOM date foreseen 01/07/2002. Despite the industrial activity of VENUS EXPRESS started in July 2002 after the SPC, we could not start full activity and procurement until the LOL from ASTRIUM in November. Structural dummies delivery is still TBC and should be finalized at the RIR. We are confident that we can make an effort to match the EM delivery as agreed in the partnership agreement but certainly an anticipated delivery of the FM will push all the activity in criticality. This matter will be hopefully deeper discussed at the RIR. In all cases an official position from ESA releasing	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

all the proprietary items from ROSETTA is needed.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Experiment Management Plan Reference of Document : None	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Pragraph 7-2 p 16/27	Importance : MAJOR
Synthesis of the Comment : **RELATIONSHIP WITH ESA/ASTRIUM PROJECT OFFICE TO BE DESCRIBED IN THE DOCUMENT.**	RID Identification : Reviewer ID : EB 3 Domain ID : MGT
Reviewer Comment or Question : Formal communication, administrative and technical data exchange, reviews are TBD. This shall be updated in next issue of the management plan.	Reviewer Recommendation : Please, would you complete the document by providing the chapters 7.2.1, 7.2.2 and 7.2.3.
P.I. or E.M. Answer : This section will be updated soon after the RIR where possibly this matter will be discussed.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Experiment Management Plan Reference of Document : None	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Pragraph 7-4-5 p 17/27	Importance : MAJOR
Synthesis of the Comment : **REPORTING TO BE CLARIFIED IN THE MANAGEMENT PLAN**	RID Identification : Reviewer ID : EB 4 Domain ID : MGT
Reviewer Comment or Question : Reporting is TBD in the document. It is proposed to discussed this issue at RIR in order to agree a way to proceed.	Reviewer Recommendation : Please, would you update the document, since this issue will have been discussed with Astrium and ESA.
P.I. or E.M. Answer : This section will be updated soon after the RIR where this matter will be discussed as suggested.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Experiment Management Plan Reference of Document : None	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Overall document	Importance : Editorial, minor
Synthesis of the Comment : **VEX Reference to be provided for the management plan**	RID Identification : Reviewer ID : EB 5 Domain ID : MGT
Reviewer Comment or Question : No reference has been provided to the Experiment Management Plan. This shall be done for next update.	Reviewer Recommendation : Please, would you put a VEX reference to the Experiment management Plan document for its next update.
P.I. or E.M. Answer : OK, it will be done for the future. Moreover an effort should be done on both sides from a PID-B and a PID-A point of view to provide this docs referenced as VEX program in order to reduce as much as possible any reference to MEX or ROSETTA.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :CIL Reference of Document :VIR-GAL-LI-068	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : Minor, if editorial.
Synthesis of the Comment : **TO PROVIDE THE CLOSURE JUSTIFICATION OF THE ACTIONS, IDENTIFIED AS ON GOING.**	RID Identification : Reviewer ID : RO 5 Domain ID : MGT
Reviewer Comment or Question : Issue dated 2 Sept 98 contains several actions, which are still On going.	Reviewer Recommendation : Please, confirm the latest information available on the topics identified as “on going” and provide the closure of these actions, particularly if applicable to VEX.
P.I. or E.M. Answer : VIRTIS CIL (VIR-GAL-LI-068) has been updated. Issue 2 is now available.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :PID A Compliance Matrix and List of NC's(PA) Reference of Document :	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : Minor / or / MAJOR
Synthesis of the Comment : **UPDTATE THE COMPLIANCE MATRIX TO PID-A**	RID Identification : Reviewer ID : RO 7 Domain ID : MGT
Reviewer Comment or Question : PSA and WCA are NC and Safety program is PC. -This is not in line with VIRTIS PA Plan contents(VIR-GAL-PL-007 issue 3 April 1999), for which activities have to be done and requirements -Some stress (little)exists after Electronic Thermal analysis -Hazard analysis seems done but not issued. Could we get information on the necessary data in line with PA plan in order to check the suitability of the design? Is PA plan still valid?(some called standards are obsolete and replaced today)	Reviewer Recommendation : Please, confirm the suitability of PA plan to VEX program, and update it if necessary. Please, provide the justification data relating to the NC and PC statements, and issue RFW if necessary.
P.I. or E.M. Answer : A dedicated VIRTIS for Venus Express PA Plan is foreseen. In the frame of the Rosetta Program, PSA, WCA and Hazard Analysis have not been considered anymore by ESA and ASI as baseline documents, hence they have not been produced. As a consequence, PSA, WCA and Hazard Analysis are not foreseen for VIRTIS for Venus Express. More details will be available within the Compliance Matrix to PID-A which is to be provided.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure :

	Closed / or / OPEN

R.I.R REVIEW ITEM DISCREPANCY

Title of Document : CIL Reference of Document : RO-VIR-UM-001 iss.2	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Page 86 to 92	Importance : MAJOR
Synthesis of the Comment : **A DESCRIPTION OF VENUS EXPRESS OPERATIONS IS MISSING**	RID Identification : Reviewer ID : PR-01 Domain ID : MGT
Reviewer Comment or Question : The User Manual is a Rosetta document. Could you describe the operations foreseen for Venus Express ? What are for instance the operational constraints for the planet mosaic mode : ❑ Number of images, ❑ Duration for each image acquisition, ❑ Timing constraints between images (acceptability of a varying distance if the observation is performed between apocentre and pericentre) ❑ Pointing performance or pointing stability constraints if any.	Reviewer Recommendation : Please provide a VEx document. Describe the operations in terms of time sequence with constraints, and not only in terms of number of pictures and total amount of data.

P.I. or E.M. Answer :	Reviewer Comment on Answer :
The VIRTIS-VEX scientific observation scenario must be defined in the EID-B doc. As a baseline we provide in attach here a PDF doc already discussed at the various Venus SWT for the entire payload, named as "VEX_science_orbits4.pdf". Please note that the scientific observations can't be frozen today since a more general discussion will be done at the next Venus SWT and more specifically for VIRTIS at the next general meeting supposed to be planned at the end of January, beginning of February after the AO extra team selection by ESA.	Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

2.2 DEVELOPMENT, AIV AND SCHEDULE

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Experiment Design Verification Reference of Document : RO-EST-RS-3001/EID B	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Overall document	Importance : MAJOR
Synthesis of the Comment : **MODELS DEFINITION PROVIDED TO VEX TO BE DEFINED.**	RID Identification : Reviewer ID : EB 6 Domain ID : DEV
Reviewer Comment or Question : The Experiment Design Verification being the ROSETTA one, it does not enable to identify what will be the definition of the different models dedicated to VEX, neither to analyse their representativity and their suitability for the different steps of the program.	Reviewer Recommendation : Please, would you provide a specific VEX Design Development and Verification Plan, including: > the model philosophy proposed for VEX, with models qualification status versus to VEX requirements (= MEX PIDA and partnership agreement requirements); > the qualification approach versus to VEX module by module and at VIRTIS instrument level, when delta design are identified.
P.I. or E.M. Answer : See attached draft document VIRTIS for VEX DDV Plan	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Experiment Design Verification Reference of Document : RO-EST-RS-3001/EID B (Vol. 4)	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Paragraph 4.2 p 4/19	Importance : MAJOR
Synthesis of the Comment : **TEST MATRIX TO BE PROVIDED FOR EACH VIRTIS MODULE MOUNTED ON THE DIFFERENT VEX MODELS**	RID Identification : Reviewer ID : EB 7 Domain ID : DEV
Reviewer Comment or Question : The experiment test matrix shall be provided specifically for VEX on the base of the proposed models.	Reviewer Recommendation : Please, would you provide the required DDVP document by including the relevant test matrix with regards to the different modules of VIRTIS, models by models.
P.I. or E.M. Answer : Merge with RID EB6-DEV	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : System Ground I/F and activities requirements Reference of Document : RO-EST-RS-3001/EID B (Vol. 5)	Instrument / Experiment ***VIRTIS***
Section and Page of Document : General	Importance : MAJOR
Synthesis of the Comment : **ELECTRICAL INTERFACES WITH SATELLITE VEX TEST BENCH TO BE VERIFIED**	RID Identification : Reviewer ID : EB 8 Domain ID : DEV
Reviewer Comment or Question : The status of representativity of the EM model dedicated to VEX shall be provided, in terms of data packaging, frequency and response time telemetry.	Reviewer Recommendation : Please, provide the status of representativity of the VIRTIS EM Model.
P.I. or E.M. Answer : The EM model foreseen for VEX is the EQM model used for ROSETTA. At the moment this model is still used by ESA in the frame of Rosetta mission. The EQM model is representative of the VIRTIS ROSETTA FM model both for electrical and S/W I/Fs, except for the following: 1. The PROM software (i.e. primary boot functions) is EM version (VIR-DLR-LI-021 release note is available in the data package). 2. For what concerns the PEMs, they are connected to dummy loads (ROIC for IRFPA, EM CCD for VIS FPA, resistors for the other loads). 3. Power supply. 4. Coolers load (because of different operative conditions). The present performances of IEEE-1355 interface is reported in annex to the RID. A upgrading activity to adapt the Rosetta EQM model to Venus EM requirements is under evaluation for what concerns the PROM and EEPROM software in the Main Electronics and the Programmable Logic Devices in the PEMs. The estimated time to	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

upgrade and re-test the model is about 1-2 months before the delivery.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

VIRTIS 1355 TM Interface Performance

This Technical Note sumarizes the performance of the VIRTIS instrument (Rosetta/VIRTIS FM Software V3.61 used for VVX EM and baseline for VVX FM) on the high speed 1355 interface to the S/C SSMM. After analysis of interface performance (calculation and partially measurements), some parameter are defined to be able to analyse the SSMM performance at Astrium. These parameter are requirements to the S/C (SSMM) to operate VIRTIS in worst case modes. Generally and analysed in detail (see below) the following interface performance parameter are applicable:

Interface frequency (data rate):	10MBit/s
Short peak TM data rate during TM packet transfer:	> 6MBit/s
Data rate nominal science modes:	M_SCIENCE_NOMINAL_1 H_DATA_NOMINAL_OBSERVATION
Data rate maximum (worst case) modes:	M_Test(M_ERT=5sec, No_Compression) or M_CALIBRATION(No_Compression) H_SCIENCE_MAXIMUM_DATA_RATE (H_IRT=700ms, No_Compression) or H_SCIENCE_BACKUP (H_IRT=5000msec, No_Compression)
Average TM rate over long time in –M and –H nominal science modes (up to hours):	< 57KBit/s (see SUM, VIR-DLR-MA-006)
Average TM rate over long time in –M and –H maximum (worst case) modes (up to hours):	< 1084KBit/s (see SUM, VIR-DLR-MA-006)
TM packet maximum size during a TM packet burst:	512 words of each TM Packet (except last one) during 1...25msec
TM minimum packet size during a TM packet burst:	> 14 words of last TM Packet during 1...25msec
TM packet frequency during a TM packet burst: (Burst = a Sub-Slice with 512words / TM packet)	2...19 TM packets during 1...25msec
TM packet average frequency during External Repetition Time (ERT):	< 3,5msec during >5sec
SSMM allowed peak latency once between TM packets within External Repetition Time (ERT): (S/W timeout for TM packet transfer before TM packet data loss and event issue)	< 500msec during >5sec
SSMM allowed average latency between end of TM packet 1 to start of TM packet 2 during External Repetition Time (ERT):	< 2,1msec during >5sec

S/C latency / packet = Available Transfer Time / packet - Archived Transfer Time / packet
Archived Transfer Time / packet = 512words/TM packet * 16bit/word / 6Mbit/s = 1,4msec/TM packet
Available Transfer Time / packet = 800ms / 228 packets = 3,5ms / packet
S/C latency / packet = 3,5ms / packet – 1,4ms / packet = 2,1ms / packet
Worst case is M-VIS Slice transfer without binning, without compression
max. time for M-VIS Slice transfer(0,8s) = M-VIS acquisition time(3,5s) + processing time (0,7s)
Note, measured with SIS: latency = 0,2ms, TM packet transfer time (incl. latency) = 1,3ms

Long peak TM rate during about < 600ms interface transfer time:	> 2,34MBit/s

3,5msec/packet = 3,5msec/512words/16bit/word = 2,34Mbit/s

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : CR, RFW, NCR lists and compliance matrix Reference of Document : /	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **RFW'S, NCR'S AND ANY ECR APPLICABLE TO VEX**	RID Identification : Reviewer ID : EB 9 Domain ID : QPA
Reviewer Comment or Question : All the ROSETTA Request For Waivers and Non Conformance Reports are provided. They cannot be accepted without proper VEX system assessment… We propose the following logics to assess them carefully in the frame of VEX program. 1- As a first step, and for Astrium review, a clear VIRTIS compliance status to the MEX PID-A requirements (VEX applicable document) shall be given, with potential reference (in case of "NC" status) to either one Rosetta RFW or one Rosetta NCR, as relevant. *Note 1: the relevant NCR's can only be confirmed after identification of the Rosetta models to be used on VEX* 2- As a second step, the acceptability for VEX of the remaining Rosetta RFW's and NCR's, and non analysed in the frame of the first step, will be assessed through a second – and probably less critical - review with Astrium.	Reviewer Recommendation : Please, 1-Would you provide for VEX VIRTIS the full compliance matrix to the MEX PID-A, by identifying when status is non compliant (NC), the reference of the relevant Rosetta RFWs or NCRs if any. Then , would you attach these relevant Rosetta RFW's and NCR's in annex of your compliance matrix. Note 3: these RFW's an NCR's will then be analysed by Astrium in the frame of the PID-A requirements 2-Would you provide in a specific file the Rosetta NCR's and RFW's which are not relevant to the PID-A neither to the Rosetta H/W for VEX, with a statement of relevance for VEX *Note 4: this file will then be assessed with Astrium through a specific review.*

Note 2: indeed, even if ROSETTA RFWs and NCRs are not relevant to MEX PID-A, neither to the Rosetta H/W to be used on VEX, they have to be carefully analysed.	
P.I. or E.M. Answer : See MG 03 answer to previous EB 9 / QPA RID.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : FMECA Reference of Document : VIR-GAL-TN-070 iss.2	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Page 50, § 9	Importance : Minor, if editorial
Synthesis of the Comment : **Work to be completed**	RID Identification : Reviewer ID : CSJ-02 Domain ID : DEV
Reviewer Comment or Question : "This chapter will be prepared …" This open work has never been completed.	Reviewer Recommendation : Please, would you complete it.
P.I. or E.M. Answer : See answer to RID RO8-QPA	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

2.3. PRODUCT ASSURANCE

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : CR, RFW, NCR lists and compliance matrix Reference of Document : /	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **CR, RFW AND NCR APPLICABLE TO VEX SHALL ONLY BE PROVIDED.**	RID Identification : Reviewer ID : EB 9 Domain ID : QPA
Reviewer Comment or Question : All the ROSETTA Request For Waivers and Non Conformance Reports are provided. We propose the following logic to assess them properly in the frame of VEX program. 1- As a first step, each VIRTIS compliance status to the MEX PID-A requirements (VEX applicable document) shall explicitely refer to the ones of the ROSETTA RFW's and NCR's, which are relevant to the analysed requirement. These RFW's an NCR's will then be analysed by Astrium in the frame of the PID-A requirements. 2- As a second step, after identification of the ROSETTA models to be used on VEX, relevant NCR's issued in the frame of these specific models manufacturing to be assessed by Astrium in the frame of VEX application. 3- As a third step, the acceptability for VEX of the remaining ROSETTA RFW's and NCR's non analysed in the frame of the 2 first steps, will be assessed through a specific review with Astrium. Indeed, even if ROSETTA RFWs and NCRs are not relevant to MEX PID-A, neither to the ROSETTA H/W to be used on VEX, they have to be specifically analysed in the frame of VEX.	Reviewer Recommendation : Please, would you provide for VEX VIRTIS the full compliance matrix to the MEX PID-A, by identifying when status is non compliant, the reference of the relevant ROSETTA RFWs or NCRs if any. Then , would you attach these relevant ROSETTA RFW's and NCR's in annex of your compliance matrix. Would you provide the definition of the ROSETTA models intended to be used on VEX and their corresponding NCR's if any. Would you provide in a specific file the ROSETTA NCR's and RFW's which are not relevant to the PID-A neither to the ROSETTA H/W for VEX. This file will then be assessed with Astrium through a specific review.
P.I. or E.M. Answer :	Reviewer Comment on Answer :

A Compliance Matrix to PID-A, with the reference to NCRs and RFWs, will be provided. (refer to previous EB 9 / QPA RID also).	Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Parts, materials and processes lists Reference of Document : VIR-GAL-LI-069 iss.3/ VIR-GAL-LI-081 iss.1/ VIR-GAL-LI-082 iss.1	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : Minor
Synthesis of the Comment : **Red-marked copies shall be formalised.**	RID Identification : Reviewer ID : CSJ-03 Domain ID : QPA
Reviewer Comment or Question : Each document is a red-marked copy.	Reviewer Recommendation : They should be formally issued.
P.I. or E.M. Answer : It's not foreseen an editorial updating. The PMP lists will be accurately reviewed for compliance to Virtis for Venus project. This will be done after the implementation of the minor design changes foreseen for Venus Express.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :VIRTIS Data pack Reference of Document :VVX-GAF-DP-001	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : Minor
Synthesis of the Comment : **VIRTIS VEX documents numbering to be improved.**	RID Identification : Reviewer ID : RO 1 Domain ID : QPA
Reviewer Comment or Question : Documentation numbering is not harmonized with clear link to VENUS EXPRESS (VEX)	Reviewer Recommendation : Please propose a way of improvement to better proceed in the future.
P.I. or E.M. Answer : The RIR Data Package was raised in a very short time making use of several documents of Rosetta Program and some non configured documents. It has implied the not very well harmonized document identification. It's foreseen to issue a CADM Plan dedicated to VIRTIS for Venus Express. Base of this plan will be the document codification reported in annex 1.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

- IAS- Orsay (France) **ORS**

DD Document Type Code shall be indicated as in Table 1 (preliminary list)

NNN Sequential number , composed by three digits starting from **001**, for each document category and for each Company.

Remarks:

- *This code, together with the Issue N° and date of Issue, will be shown on the first page and on the top right hand corner of each page of the document.*
- *The successive updates of document shall be identified by their issue number.*
- ***Revision** within the same issue (e.g. issue 1, revision 3) **are not allowed.** The first issue of a document is issue 1 (issue 0 not allowed).*
- *For Waiver, Deviation, Document Change Notice, NCR, Project Directive, Log,Book, issue is not required*

Document Coding System

GA, International Partners, Subcontractors and Main Supplier will comply with the requirements for identification and coding of deliverable items as follow.

The code is assembled in the sequence:

VVX-CCC-DD-NNN

VVX Program Code – **V**IRTIS for **V**enus **Express**

CCC Company Code : that is

- Galileo Avionica Firenze **GAF**
- Insitut fuer Planeteterkundung DLR (Germany) **DLR**
- Observatoire de Paris , DESPA (France) **DES**
- Techno System (Italy) **TCS**
- Laben (Italy) **LAB**
- Kayser Threde **KAY**
- Istituto di Astrofisica Spaziale (Italy) **IAS**

MA	Manual (S/W,Repair manuals,etc..)
MM	Minutes of Meeting
MT	Matrix
NCR	Non Conformance Report
NW	Network
PB	Presentation/Brochure
PD	Project Directive
PL	Plan,General
PP	Proposal
PR	Procedure,General
PS	Procurement Specifications
RD	Request for Deviation
RF	Request for Proposal
RFD	Request for Deviation
RFW	Request for Waiver
RP	Report,General
RS	Requirements Specification
SS	Support Specification
SW	S/W Requirement Document
SY	System Specification
TE	Tree
TN	Technical Note
TP	Test Procedure
TR	Test Report
UR	User Requirement Document
VC	Verification Control Document
VS	Environmental Specification
WS	Statement of Work

Table 1 - Document type code

Document	Type Code
AC	Acceptance Certificate
AD	Architectural Design Document
BD	Budgets
CC	Certificate of Conformance
CH	Chart/Schedule
CL	CIDL, ABCL
CN	Contract Change Notice
CT	Contract
DC	Document Change Notice
DD	Detail Design Document
DN	Delivery Note
DP	Data Package (General)
DW	Drawing
EC	Engineering Change Proposal (ECP)
ED	End Item Data Package
HB	Handbooks (operation req. ,etc...)
IC	Interface Control Document
IR	Inspection Report
IS	Interface Specification
LB	Log Book
LI	List,General

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :Instrument description Reference of Document :VVX-GAF-RP-001	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **COMPATIBILITY OF DETECTORS TO VEX RADIATION ENVIRONMENT TO BE CONFIRMED.**	RID Identification : Reviewer ID : RO 3 Domain ID : QPA
Reviewer Comment or Question : -Paragraph 5.2.7 :Calibration Shutters and TIC coated ball bearings are CIL items. What is the life duration margin, which has been achieved by the life tests, compared to the mission life duration requirement? -Paragraph 5.2.5 IR detectors(IR FPA) shall be able to withstand total dose of 3 Krads(Si) AND ARE latch up free May be, it is not sufficient with regards to VEX radiation conditions.Please clarify.	Reviewer Recommendation : Would you clarify in the Instrument description document what is the test demonstrated margin in terms of life duration compared to the VEX requirement. Moreover, would you confirm that the total dose of 3 Krads (Si) demonstrated as acceptable for the detectors is well compatible of VEX radiations environment.
P.I. or E.M. Answer : **Shutter lifetime**: Shutters are used for calibration every minute (worst case). VIRTIS in-flight operation: 1000 H, i.e. 60 000 cycles; On-ground testing: 200 H, i.e. 12 000 cycles. So, according to PID-A 8.4.1.4.2, the Lifetime test requirement is: 4*12 000+2*60 000 = 168 000 cycles. As a 270 000 cycles test has been already performed during ROSETTA/VIRTIS development, there is no need for additional testing for VEX. **IR detectors**:	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

The requirement spec for the **IR detector** (M and H channels) procurement asked for a 3krad total dose radiation tolerance taking into account the Rosetta mission environment. For the EOL analysis the device dark current was assumed to be increased of 3 times after 3 Krad (Si) total dose. Actually the measured dark current of the devices is 10 times less then the one assumed for the above analysis. Therefore the IR detector is able to withstand the Venus expected total dose with sufficient margin. A irradiation test on IR SCA model has been performed and report is available in the Vex Data Package (Verification and AIT/Qualification section in the CD-ROM). A first calculation of the total radiation dose of the M-channel for the Venus Express mission (by means of the equivalent aluminum thickness calculation) gives the following results: Nominal mission: **1.969** Krad (Si) Extended mission: **3.426** Krad (Si) For what concerns the latch up problem, the device is not 'latch up free' guaranteed but the manufacturer analysis (Raytheon doc PL5617) explains that the probability to activate the latch up phenomenon is close to zero if the detector works at cryogenic temperature.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :Configuration Status List Reference of Document :	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **VIRTIS CONFIGURATION STATUS LIST TO BE PROVIDED.**	RID Identification : Reviewer ID : RO 4 Domain ID : QPA
Reviewer Comment or Question : Only ME SW and ME PROM SW Configuration status lists are provided. Is an overall VIRTIS Configuration status list available?	Reviewer Recommendation : Please, would you provide the complete VIRTIS configuration status list for VEX.
P.I. or E.M. Answer : VIRTIS Configuration Status is identified in the CIDL VIR-GAL-CL-104 is. 6 and in the called subsystem level CIDLs. All the CIDLs (system and subsystem level) have been already sent by PI in paper copies (see enclosed mail) and they are also available in electronic form in the RIR Data Package CD-ROM at the following path: \Configuration\As Designed Configuration\ Cidl	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

List of items provided:

- CD containing VIRTIS Rosetta EID-B issue 2 and full VIRTIS FM Acceptance
Data Package

- VIRTIS Rosetta EID-B issue 2 in paper form
- extract from VIRTIS FM Acceptance Data Package in paper form as follows:

o	Section 1	---None---
o	Section 2	---None---
o	Section 3	---None---
o	Section 4	---None---
o	Section 5	---None---
o	Section 6	Qualification Status List
o	Section 7	DCL, DML, DPL
o	Section 8	Drawings
o	Section 9	Diagrams
o	Section 10	List of Waivers
o	Section 11	Configuration Status List
o	Section 12	Serialized components list
o	Section 13	Software User Manuals
o	Section 14	---None---
o	Section 15	---None---
o	Section 16	---None---
o	Section 17	---None---
o	Section 18	---None---
o	Section 19	---None---
o	Section 20	---None---
o	Section 21	---None---

Da: Enrico Suetta [enrico.suetta@officine-galileo.finmeccanica.it]
Inviato: giovedì 31 ottobre 2002 17.24
A: Maurizio Giustini
Oggetto: [Fwd: Preliminary set of VIRTIS-VEX DP]

-------- Original Message --------
Oggetto: Preliminary set of VIRTIS-VEX DP
Data: Fri, 11 Oct 2002 17:58:45 +0200
Da: "Giuseppe Piccioni" <piccioni@rm.iasf.cnr.it>
A: "Rainer Timm" <rainer.timm@esa.int>,"Hans Eggel"
<hans.eggel@esa.int>,"Alain Clochet" <alain.clochet@astrium-space.com>
CC: "\"Enrico_Suetta\" <Enrico Suetta"
<enrico.suetta@officine-galileo.finmeccanica.it>,"<Gabriele Arnold"
<gabriele.arnold@dlr.de>,"<Angioletta Coradini"
<coradini@ias.rm.cnr.it>,"\"Pierre Drossart\" <Pierre Drossart"
<pierre.drossart@obspm.fr>

Dear all,

in the tight schedule of VEX,
it seems to me fruitful to send to you a preliminary set of the
VIRTIS-VEX
DP.
Hereafter is the list of items provided.

We sent them today by TNT express thus you should get it on
Monday-Tuesday.

Maurizio Giustini

---

best Regards.

****
Giuseppe Piccioni
CNR-IAS
via del Fosso del Cavaliere 100
00133 Roma
Phone : +39-0649934445 (4547)
Fax : +39-0620660188
E-Mail : piccioni@rm.iasf.cnr.it NEW !!! NEW !!!
****

o Section 22 ---None---
o Section 23 ---None---

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :QSL Reference of Document :VIR-DES-PL-1430/VIR-KAY-LI-025	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **QSL'S SUITABILITY STATUS FOR VEX TO BE CONFIRMED.**	RID Identification : Reviewer ID : RO 6 Domain ID : QPA
Reviewer Comment or Question : These are ROSETTA QSL's . Where is the analysis allowing to confirm the suitability of these QSL's for VEX?	Reviewer Recommendation : To provide the status of suitability of the QSL's with regards to VEX.
P.I. or E.M. Answer : The QSL must be read in conjunction with the Tech Note VVX-GAF-TN-OO2, VIRTIS Qualification Status w.r.t. VEX Mechanical & Thermal Requirements. More details about ME: • Vibration Environment: refer to VVX-KAY-TN-001 • Thermal Environment: RfW to be provided; 100% operation is not possible at hot conditions (+60°C, including 10°C margin for qualification); see also answer to RID ESOC2-RT-OPS • EMC requirements: EMC Assessment not yet performed • Radiation: Assessment not yet performed	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :FMECA Reference of Document :VIR-GAL-TN-070	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **FMECA TO BE UPDATED AND USER MANUAL TO REFLECT THE IDENTIFIED CONSTRAINTS.**	RID Identification : Reviewer ID : RO 8 Domain ID : QPA
Reviewer Comment or Question : -Paragraph 9 HW/SW, "Interaction analysis"shall be completed today according to the Software Req. document (VIR-GAL-UR-040). -Appendix A Main electronics FMECA There are several items (1.4.2;1.4.7;1.17;1.18) with remark "Safety aspect for S/C". Is this constraint mentionned and highlighted in the User Manual to be considered at satellite level?	Reviewer Recommendation : Please, update the paragraph 9 of FMECA document with regards to VEX requirements. Please, confirm that the remarks "Safety aspect for S/C" will be mentioned in the VEX User Manual.
P.I. or E.M. Answer : **Paragraph 9 HW/SW, "Interaction analysis"** The FMECA document last update is dated October 2000. Afterwards it was decided not to complete the chapter 9 since ASI and ESA accepted the document as it was. Chapter 9 should be considered deleted in the next issue. **Appendix A Main electronics FMECA** The said items causes a reverse powering of the un-powered S/C power line in case of failure. This might be a safety aspect and has to be assessed by the S/C respectively. But this is valid only for VIR-DLR-AN-003, 1.17 and 1.18 but not for 1.4.2 and 1.4.7. For 1.4.2 and 1.4.7 there is a mistake in the analysis and are not "Safety aspects for S/C". 1.4.2 and 1.4.7 are valid only in case of double failure if e.g. relay contact 1.4.2 (short circuit,	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

failure 1) and 1.4.4 (short circuit, failure 2) fail. VIR-DLR-AN-003 to be updated. Note, in any case "Safety aspect for S/C" will be mentioned in the VVX ME User Manual.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Rosetta VIRTIS EID-B Reference of Document : RO-EST-RS-3015/EID B	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Vol 1 Experiment Description §1.2.2.5 p22. FPA IR Detectors	Importance : MAJOR
Synthesis of the Comment : Manufactured/screened devices for Rosetta intended to be used for 1 yr operational life; is this sufficient for VEX?	RID Identification : ESOC01 Reviewer ID : RT Domain ID : QPA
Reviewer Comment or Question : The IR FPA selected for the Rosetta/VIRTIS mission are intended for: - operating life 1 yr, 120 cycles from 200K to 65K. Is this appropriate for the foreseen science operations scenario for VEX/VIRTIS?	Reviewer Recommendation :
P.I. or E.M. Answer : To be verified against the mission scenario considering the following note: The IR FPAs are qualified for: VIRTIS/M 199 cycles from 300K to 85K + 30 cycles from 310K to 65K VIRTIS/H 234 cycles from 300K to 85K + 30 cycles from 310K to 65K Taking into account that the foreseen flight temperature cycle is from 150K to 80K we can consider the limit of 229 for M and 264 for H as a valid limits. The flight temperature cycles have a delta temperature reduced by a factor of three respect qualification delta temperature.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

The IR FPAs are operating (ON) only during the science acquisition (detector switch ON/OFF capability).Only the time of detectors activities shall be considered in the 1 yr operative life limit, not all the time of VIRTIS activities.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

2.4. SYSTEM DESIGN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Mathematical models Reference of Document : /	Instrument / Experiment ***VIRTIS***
Section and Page of Document : General	Importance : MAJOR
Synthesis of the Comment : **THE MATHEMATICAL MODELS TO BE UPDATED WITH THE VEX SUPPORT BRACKET**	RID Identification : Reviewer ID : EB 11 Domain ID : SYS
Reviewer Comment or Question : According to meeting of last 14th of November, the mathematical models will have to be updated to take into account the VIRTIS support bracket.	Reviewer Recommendation : Please, would you update the mathematical models when both structural and thermal interfaces will be frozen.
P.I. or E.M. Answer : The mathematical models will be updated as soon as the structural and thermal interfaces will be frozen.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : VVX.GAF.TN.xxx Ed. 1.draft	Instrument / Experiment ***VIRTIS***
Section and Page of Document : IFDC.452, pages 8 & 15 /28	Importance : **MAJOR**
Synthesis of the Comment : High speed TM packetisation requirement.	RID Identification : Reviewer ID : **JL** Domain ID : SYS
Reviewer Comment or Question : Wrt VIRTIS for VEx PID SOC (& EID partB §2.8): A) IFDC-452: 4112 byte length is an upper CCSDS packet overall size limit not required to be reached. B) IFDC-452: Supplementary header is 4 byte long (typo). **C) Through VEX.MMT.CR.xxxx Ed. 1.0 dated 10/09/2002, the IFDC-452 requirement states that high speed link CCSDS packets shall have a minimum size of 1024 bytes. This is a critical major issue dealing with DMS/SSMM dynamic performance.**	Reviewer Recommendation :
P.I. or E.M. Answer : VIRTIS High speed telemetry is formatted in packets of max 1024 bytes. This means that for each *slice* all the packets are 1024 byte long except the last one that can be smaller. The frequency of the smallest one depends on the compression level (no compression, lossless or lossy compression). Increasing the TM packet size from (now) 1024bytes to 4112bytes (required) would cause a change of the RTOS used for VIRTIS and therefore a full re-qualification of software would be needed which must be avoided. Therefore a detailed analysis on VIRTIS and SSMM side should be used to see where the performance criticality is located and to keep 1024byte max TM packet size. Refer to Annex of RID EB 8 – DEV.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION

	Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : CIL Reference of Document : VIR-GAL-LI-068 iss.1	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Page 5	Importance : MAJOR
Synthesis of the Comment : **COMPLEMENTARY INFORMATION W.R.T SHUTTERS, COVERS AND PARAFFIN ACTUATORS ARE REQUIRED.**	RID Identification : Reviewer ID : NM-01 Domain ID : SYS
Reviewer Comment or Question : You mentioned on page 5 the presence of shutters, covers and paraffin actuators. I did not find any details on these device mechanisms either in FMECA/ Technical description or User Manual. Please provide more information on these devices operations. Are the shutters “one-shot” devices? What is the operating temperature of the paraffin? What is the power consumption? What is the range of time needed in flight to open or close such devices? What is the qualification status of these devices? Is there preventive monitoring which avoids the paraffin to leak, overheat or spread outside the actuators?	Reviewer Recommendation : Please provide detailed information on these devices. Confirm that there is no potential hazard during AIT activities due to mobile devices or temperature overheating. Confirm also that there is no risk of paraffin spreading all over the instrument or other units.

P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
• Shutter mechanism: it is not a one shot device. Mechanism description and data can be found in Rosetta EID B section 2.2.1.2. No potential hazard due to mobile devices during AIT activities: the shutter blade is a few grams element moving inside the V-M and V-H optical heads, inside the Optics Module (no access from the external at S/C level). • Cover mechanism: Mechanism description and data can be found in Rosetta EID B section 2.21.2. No potential hazard due to mobile devices during AIT activities: the cover door is a light plate moving very slowly (about 30 sec for full actuation) inside the Optics Module (no access from the external at S/C level). • Paraffin actuator: data can be found in Rosetta EID B section 2.5. The paraffin operating temperature is around 70ºC, the actuator is specified not to prematurely operate below 65 ºC. Operating temperature range is from -148°C to +60°C. No potential hazard due to heating during AIT activities: the actuator is located inside the Optics Module (no access from the external at S/C level). No risk of paraffine spreading all over around thanks to the double sealing stage. All mechanisms have been qualified for Rosetta on dedicated engineering/life models.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document :PID A Compliance matrix Reference of Document :VIR-DES-TN-1792	Instrument / Experiment ***VIRTIS***
Section and Page of Document :2/2	Importance : MAJOR
Synthesis of the Comment : **LENGTH OF VIRTIS CABLES TO BE DEFINED FOR VEX.**	RID Identification : Reviewer ID :RO 2 Domain ID :SYS
Reviewer Comment or Question : Cable lengths need to be clarified.	Reviewer Recommendation : Please, clarify the length of the provided cables for VIRTIS and where these data can be found in your documentation.
P.I. or E.M. Answer : The length values of the cables used in the ROSETTA mission to inter-connect the VIRTIS modules are written in the document 'VIRTIS MASS, POWER and DATA RATE BUDGET' para 4.2 page 7 (Data Package\Design and Analyses\Payload System\P-L Resources Budged\ VVX-GAF-BD-001 is 1).	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : EID-B Vol. VI Mission Ops. Requirements Reference of Document : RO-EST-RS-3015	Instrument / Experiment ***VIRTIS***
Section and Page of Document : §6.3.2.2.4, p9.	Importance : MAJOR
Synthesis of the Comment : **REQUIREMENTS FOR CO-ALIGNMENT (WAS 7' FOR ROSETTA) W.R.T. PFS AND ASPERA ON VEX?**	RID Identification : ESOC04 Reviewer ID : RT Domain ID : SYS
Reviewer Comment or Question : The document specifies 7' co-alignment accuracy wrt. Other instruments on Rosetta. What are the co-alignment pointing requirements with the other VEX instruments, both on the same mounting +X panel (e.g. SPICAV, PFS) and with those on other mounting surfaces (ASPERA, VERA, VENSIS)?	Reviewer Recommendation :
P.I. or E.M. Answer : This matter should be discussed in the framework of a common observation strategy among the different instruments. Nevertheless we can anticipate that 7' of co-alignment accuracy wrt PFS and SPICAV can be considered a baseline while the same number is definitely not necessary wrt ASPERA, VERA and VENSIS.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : CIL Reference of Document : RO-VIR-UM-001 iss.2	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Page 82	Importance : MAJOR
Synthesis of the Comment : **NEED FOR ALIGNMENTS (ON GROUND OR IN FLIGHT) TO BE DETAILED FOR VENUS EXPRESS.**	RID Identification : Reviewer ID : PR-02 Domain ID : SYS
Reviewer Comment or Question : What are the needs for alignments on ground : ❑ Mechanical or optical alignment ? ❑ With respect to S/C reference or another instrument ? ❑ What is the required accuracy ? What is the need for in flight alignments / calibration : ❑ Basic principle used (measurements on stars ?) ? ❑ Need for comparison with other instruments or spacecraft reference ? ❑ Description of foreseen operations (kind of measurements, number of measurements, timing ….)	Reviewer Recommendation : Please define the need for alignment and calibrations on ground and in flight.

P.I. or E.M. Answer :	Reviewer Comment on Answer :
The needs for alignment and co-alignment on ground and in flight are described in 2.2.6.3 and 2.2.6.4 of VIRTIS EID-B. Nevertheless any reference to the ROSETTA camera can be replaced with the optical reference cube. The in flight check of alignment is performed looking to the stars. For co-alignment wrt different instruments refer to RID ESOC04.	Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

2.5. SCIENCE PERFORMANCES – NO RID'S AVAILABLE

2.6. MECHANICAL AND THERMAL

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : VIRTIS QSL Reference of Document : VIR-GAL-LI-083	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **LIFETESTING FOR MECHANISMS**	RID Identification : Reviewer ID : HE 1 Domain ID : MTH
Reviewer Comment or Question : Lifetesting for mechanisms is not addressed in the QSL; it is considered an element of mechanism qualification.	Reviewer Recommendation : Compare the operational requirements for the mechanisms between ROSETTA and VEX and assess whether there is a need for additional testing for VEX.
P.I. or E.M. Answer : The assessment for the need of additional lifetesting of the mechanisms will be done after a more detailed clarification of the VIRTIS operational requirements on VEX. However, the baseline for VIRTIS/VEX operations will be such as to use the mechanisms within their already test proved lifetime.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

2.7. ELECTRICAL & EMC

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : RTXXXX EIR compliance matrix	Instrument / Experiment ***VIRTIS***
Section and Page of Document : p ii	Importance : MAJOR
Synthesis of the Comment : **ASTRIUM ANSWERS TO QUESTIONS MENTIONED PII – IF0D 010**	RID Identification : Reviewer ID : JPSD 1 Domain ID : ELC
Reviewer Comment or Question : 1) In order to power ON/OFF switching, High Power Commands shall be effectively used. 2) 1 TC_ON and 1 TC_OFF per LCL is OK . We confirm that one relay/switch status telemetry channel is required per switch. 3) If the heater lines can be switched ON permanently there is no need for a serial switch. Otherwise 2 serial thermoswitches are required on each line.	Reviewer Recommendation : Please, would you update the EIR compliance matrix with Astrium answers to items 1 and 2. With regards to point 3, would you confirm that there is no constraint for heater power supply. In other terms, in case of LCL failure, could you confirm that it would be acceptable for the instrument to have both nominal and redundant heaters ON for a long duration.
P.I. or E.M. Answer : **Answer to bullets 1 and 2** The EIR compliance matrix will be updated. No High Power Commands are used for VVX. **Answer to bullet 3** A RFW concerning additional switches has been issued and it is given along the answer to the RIDs. For what concerns decontamination heaters see answer to RID AC4-SYS. The Storage Heaters (hot redundancy) are not operative heaters whose purpose is to heat the CCD during cruise hibernation in order to avoid any damage to the device. During non operative phases they can remain switched on without problems, but if switched-on during science acquisition the	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

performance of VIRTIS-M can be affected (no damage, but possible S/N decrease on the IRFPA channel). The Storage Heaters are still considered in the Vex baseline.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : RTXXXX EIR compliance matrix	Instrument / Experiment ***VIRTIS***
Section and Page of Document : p ii	Importance : MAJOR
Synthesis of the Comment : **ASTRIUM ANSWERS TO QUESTIONS MENTIONED PII – IF0D 010 - FOLLOWING**	RID Identification : Reviewer ID : JPSD 2 Domain ID : ELC
Reviewer Comment or Question : Are heaters of the VIRTIS heaters lines provided and installed by VIRTIS? Are there subject to short circuit failure? Are Nominal and redundant independent and free of short circuit failure propagation from N to R?	Reviewer Recommendation : Please, would you clarify in the updated document.
P.I. or E.M. Answer : - Heaters, if mounted, are provided and installed by VIRTIS (but see also AC4-SYS RID for Decontamination Heaters). - Storage heaters can be subject to short circuit failure (see FMECA document - APPENDIX D - item M19). - Nominal and redundant are completely independent and free of short circuit failure propagation.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : RTXXXX EIR compliance matrix	Instrument / Experiment ***VIRTIS***
Section and Page of Document : p ii	Importance : MAJOR
Synthesis of the Comment : **IF0D 030 : TO CLARIFY THE LCL CLASS FOR MAIN ELECTRONICS**	RID Identification : Reviewer ID : JPSD 3 Domain ID : ELC
Reviewer Comment or Question : Assuming a peak power consumption of 70W according to VEX EICD, a class D LCL instead of F should be enough (2.6A) . Can you confirm? 70W is not consistent with EICD page 18, Imax=3.8A!	Reviewer Recommendation : Please, would you clarify the inconsistency between EICD and EIR compliance matrix and confirm that Class D LCL is suitable for +28V instrument bus.
P.I. or E.M. Answer : The VEX EICD power budget (VVX-GAF-BD-001) shows a possible power consumption of 70W plus 11W (M-Cover) plus 6,5W (H-Cover) total of 87,5W ±2%, the **maximum nominal current** is 3,4A @ 26V (28-2%-Rout*Iload). As defined in PID-A the LCL class is depending on the maximum nominal current, therefore LCL class F is required. The EICD (RO-EST-RS—3001/EID-B) page 18 shows the envelope limits that VIRTIS Inrush-current should respect. Please consider the RO-VIR-NCR-0056 also.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : RTXXXX EIR compliance matrix	Instrument / Experiment ***VIRTIS***
Section and Page of Document : p 5	Importance : Minor / or / MAJOR
Synthesis of the Comment : **IF0D030**	RID Identification : Reviewer ID : JPSD 5 Domain ID : ELC
Reviewer Comment or Question : Storage Heater will not be necessarily a class A as this heater will be surely be put in parallel with other ones. VIRTIS PI to provide the heater value +/-tbd% rather than the class. Can this heater be ON permanently, with the redundant On as well?	Reviewer Recommendation : Please, would you update the EIR compliance matrix document by providing the heater value and by clarifying if both nominal and redundant heaters can be ON permanently simultaneously.
P.I. or E.M. Answer : The **Storage heaters** (hot redundancy) used for the Rosetta Mission are 10K resistors (RNC90). TBC for VEX after a thermal analysis when up-dated boundary conditions. See also RIDs JSPD1-ELC and JPSD2-ELC.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : RTXXXX EIR compliance matrix	Instrument / Experiment ***VIRTIS***
Section and Page of Document : p 13	Importance : MAJOR
Synthesis of the Comment : **IFDG010 &025**	RID Identification : Reviewer ID : JPSD 6 Domain ID : ELC
Reviewer Comment or Question : Compliance to TC and TM protocole to be cheked asap	Reviewer Recommendation : Please, would you update the EIR complianc matrix by clarifying the TC and TM protocole asap.
P.I. or E.M. Answer : The telemetry and telecommand protocols are described in the VIRTIS Rosetta EIDB vol 2.7. TC/TM protocol is compliant to Rosetta EID-A incl. PSS-04-106, -017, 47/TTC-B-01. PSS-04-151 (as shown in MEX-MMT-SP007, IFDG-001) was not required by Rosetta, therefore is TBC for VVX. For what concerns 'MARS EXPRESS Space/Ground ICD (SGICD MEX-ESC-IF-5001 §5:1)' we understand from the email by Elisabeth BRUGNERA dated 3.12.2002, that the mentioned document is obsolete and that it will replaced by two documents: - the generic TM/TC ICD, MEX-MMT-IF-0936 issue2 Rev2 - the VEX Payloads TM/TC and Software ICD to be issued Please provide these two documents.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure :

	Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : RTXXXX EIR compliance matrix	Instrument / Experiment ***VIRTIS***
Section and Page of Document : p 45	Importance : MAJOR
Synthesis of the Comment : **IFDT020**	RID Identification : Reviewer ID : JPSD 7 Domain ID : ELC
Reviewer Comment or Question : Max fault voltage is 7V instead of 5V required. The detail of the power supply failure analysis is not provided (how do you get 7V?). Can you provide it.	Reviewer Recommendation : Assuming 7V is confirmed by the failure analysis to be provided, would you provide a formal RFW with the justification.
P.I. or E.M. Answer : Over-voltage on the VIRTIS Power Supply output lines is limited per design to the following maximum values: - +5V max 6,35V (DHSU incl. S/C I/F, V-H, V-M) - +5 IFE max 5,85V - +12V max +18V - -12V max -18V - +21V max 26V If over-voltage occurs the VIRTIS Power Supply is switched off completely within t < 250ms. In case of VIRTIS power supply failure, the S/C I/F digital +5V is designed in order to have a max out voltage lower than 6.35V. If requested, a formal RFW will be provided.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION

	Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : RTXXXX EIR compliance matrix	Instrument / Experiment ***VIRTIS***
Section and Page of Document : p 3	Importance : MAJOR
Synthesis of the Comment : **IFOD010**	RID Identification : Reviewer ID : JPSD 8 Domain ID : ELC
Reviewer Comment or Question : IF no additionnal switching, the risk is in case of LCL failure in short circuit: - To get a permanent power consumption, even in S/C safe mode whereas the payload should be off - To get the payload powered both on A and B side. Is this tolerable?	Reviewer Recommendation : Would you confirm that these failures are acceptable for the instrument.
P.I. or E.M. Answer : See the relevant issued RFW. - Permanent power consumption is no problem when S/C is in safe mode. VIRTIS will reset the DPU (restart of Virtis-safe mode) as soon as S/C communication breaks down after some minutes. - Powering of main and redundant side is possible without damaging VIRTIS but not acceptable as operational (failure) mode.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : VIR-GAL-LI-087	Instrument / Experiment ***VIRTIS***
Section and Page of Document :	Importance : MAJOR
Synthesis of the Comment : **EMC QUALIFICATION STATUS**	RID Identification : Reviewer ID : LG 1 Domain ID : EMC
Reviewer Comment or Question : Many NC to EMC requirements are identified. What is their status? What are the design modifications (if any) that could have some EMI impacts ?	Reviewer Recommendation : Please provide : - compliance matrix to EMC requirements of VEX PID-A - analysis of possible EMI impact of design modifications if any
P.I. or E.M. Answer : All the NCRs are closed. Compliance matrix to EMC requirements will be provided. At the moment **no modifications are foreseen**.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

2.9. OPERATION AND SOFTWARE

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : EID-B Vol. VI Mission Ops. Requirements Reference of Document :	Instrument / Experiment ***VIRTIS***
Section and Page of Document : §6.3.2, p6.	Importance : MAJOR
Synthesis of the Comment : **FULL INSTRUMENT OPERATION CANNOT BE GUARANTEED BELOW 1.4AU.**	RID Identification : ESOC02 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : "Instrument power dissipation from Main Electronics Module is such that operations cannot be guaranteed for heliocentric distances below 1.4 AU." MEM dissipation has been reduced by 30% for Rosetta. Is this sufficient for VEX foreseen science operations scenario? Is it foreseen for VEX/VIRTIS to operate only either M or H channels independently? Is the VEX/VIRTIS radiator design compatible with simultaneous operations of –M and –H channels?	Reviewer Recommendation : Clarify Main El. Module dissipation impact on VEX environment science operations constraints.
P.I. or E.M. Answer : The full instrument operation not guaranteed below 1.4 AU is an ECR issued in the frame of the Rosetta mission. In operative terms it means that the maximum full power operative I/F temperature for ME is 40°C at the TRP. Above 40°C, only operations at reduced power are allowed: only one channel at a time (either V-M or V-H) can be operated. See also the Tech Note VVX-GAF-TN-OO2, VIRTIS Qualification Status w.r.t. VEX Mechanical & Thermal Requirements. In the frame of Rosetta, VIRTIS ME FM has been qualification tested successfully at +60°C environment conditions (steady state condition) in 70% power ME operational mode. The derating temperatures of 80°C of some components (incl. PCB) will slightly be exceeded in this case.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

The Main Electronic can be operated in +50°C environment (40°C + 10°C qualification margin) in full power mode without performance degradation considering all derating requirements. Note: maybe the ME thermal time constant of 3…5 hours (heating up time) could be considered for VIRTIS operation. The eventual impact on VEX science operations will be assessed after a more detailed clarification of the VIRTIS operational requirements and the updated VEX S/C environment.	
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : GENERAL Reference of Document : N/A	Instrument / Experiment ***VIRTIS***
Section and Page of Document : N/A	Importance : MAJOR
Synthesis of the Comment : **NO VENUS EXPRESS SPECIFIC INFO IS PROVIDED IN ANY OF THE DOCUMENTATION (EID-B).**	RID Identification : ESOC03 Reviewer ID : RT Domain ID : ESA/ESOC
Reviewer Comment or Question : Is it intended to provide a summary of the main consequences for VIRTIS of the very different VEX mission from Rosetta? These have been provided in a summary document for MEX/PFS for example. For example, in the Vol. VI Mission Ops. Req. section, a mission timeline for modes/data-rates/power consumption is needed.	Reviewer Recommendation : Provide overview document outlining the main changes in mission operations for Venus Express and their impact on the instrument design and operations.
P.I. or E.M. Answer : The §6.3 of EID-B vol.6 is tuned for the ROSETTA mission and this section will be updated for VEX operation scenario in the next issue.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : EID-B Vol. VI Mission Ops. Requirements Reference of Document : RO-EST-RS-3015	Instrument / Experiment ***VIRTIS***
Section and Page of Document : §6.3.2.3.3, P10	Importance : MAJOR
Synthesis of the Comment : **WHAT ALTERNATIVE EXISTS FOR SPECTRAL CALIBRATION OF BOTH CHANNELS TO THE EARTH FLY-BY OBSERVATIONS FOR ROSETTA?**	RID Identification : ESOC05 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : "Observation of the Earth's atmosphere will allow accurate spectral calibration of both channels." How essential for spectral calibration are the Earth fly-by observations? What alternatives exist to satisfy these requirements? For example, during NEO commissioning would VIRTIS require an Earth observation pass (i.e. specific pointing attitude)?	Reviewer Recommendation :

P.I. or E.M. Answer :	Reviewer Comment on Answer :
From a calibration point of view VIRTIS for VEX does not require a specific observation of the Earth and it can be excluded in the baseline. An optimum spectral calibration can be performed directly looking at VENUS atmosphere. Nevertheless a possible campaign of Earth observation should be discussed only in the field of a near Earth verification of the instrument.	Reviewer Position wrt Answer : Closed / or / OPEN
Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : EID-B Vol. VI Mission Ops. Requirements Reference of Document : RO-EST-RS-3015	Instrument / Experiment ***VIRTIS***
Section and Page of Document : Table 6.1.4 – p13.	Importance : MAJOR
Synthesis of the Comment : **DO THE SPECIFIED ANGULAR VELOCITIES FOR VARIOUS DISTANCES TO TARGET MATCH FOR VENUS OBSERVATIONS?**	RID Identification : ESOC06 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : For Rosetta/VIRTIS SIWA comet closest approach is 2550km. Pericenter pass for Venus will be 250km. Is the angular velocity for nadir pointing requirement met by MEX/VEX bus?	Reviewer Recommendation :
P.I. or E.M. Answer : The dwell time of a pericenter at 250km in altitude does not allow imaging of VIRTIS during the pericenter pass and indeed the observation at pericenter will be “spectral type” while the imaging capability will be used for altitude higher than about 6000km in general and for the apocenter in particular.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : EID-B Vol. VI Mission Ops. Requirements Reference of Document : RO-EST-RS-3015	Instrument / Experiment ***VIRTIS***
Section and Page of Document : §6.5.4, p22	Importance : MAJOR
Synthesis of the Comment : **EXPANDED HOUSEKEEPING MONITORING TELEMETRY DATA REQUIRED FOR SPECIFIC VENUS ORBIT OPERATIONAL CONDITIONS?**	RID Identification : ESOC 07 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : Most important housekeeping data for the instrument health relate to critical temperatures of instrument components. Are these sufficient for VEX science operations scenarios, considering the more extreme thermal environment for VEX?	Reviewer Recommendation : Confirm no change to HK TM data/rates for VEX/VIRTIS.
P.I. or E.M. Answer : The HK TM data/rates seem sufficient.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : Rosetta EID-B RO-EST-RS-3015/EID B	Instrument / Experiment ***VIRTIS***
Section and Page of Document : 6.3.2.2.2	Importance : Minor
Synthesis of the Comment : **Alignment attitude required**	RID Identification : ESOC 08 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : It is not clear, if the VIRTIS requirement requires an additional spacecraft attitude.	Reviewer Recommendation : VIRTIS to investigate compliance for alignment attitude with baseline spacecraft attitudes.
P.I. or E.M. Answer : This question is not clearly understood. VIRTIS operations in terms of alignment accuracy and stability are compliant to the VEX (or MEX) resources and no additional request is foreseen from this point of view. If the present has to be intended in terms of spacecraft orientation operations, it has to be discussed at SWT level.	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : Rosetta Radioscience Investigations Prelaunch Experiment Performance Report RO-RSI-IGM-RP-3115	Instrument / Experiment ***VERA***
Section and Page of Document : 6.3	Importance : Minor
Synthesis of the Comment : **A typical bistatic radar session will be in the order of a few hours.**	RID Identification : ESOC 09 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : Bistatic radar operation of a few hours will require a special attitude with changing angles. Baseline spacecraft attitudes do not cover this case.	Reviewer Recommendation : VERA to define bistatic radar attitudes in detail. Reduction of observation time required.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : 2.5.5.3	Importance : Minor
Synthesis of the Comment : **Several passes above selected targets are required.**	RID Identification : ESOC 10 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : How do you do several passes above selected targets in Venus orbit?	Reviewer Recommendation : Clarify required spacecraft attitude and orbit.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : 2.5.5.4 4.1.4.3 table 7.1.9-1	Importance : Minor
Synthesis of the Comment : **S-band uplink for solar corona / 60 days of solar corona measurements /6.5 h solar corona measurements/day**	RID Identification : ESOC 11 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : Nominal uplink will be in X-band. Nominal ground station is Cebreros (X-band only). Operational concept for 24h orbit reserves short pass slots in New Norcia in pericentre for VeRA, apocentre communications with Cebreros in X-band.	Reviewer Recommendation : VeRA to clarify if S-band uplink is a requirement for solar corona experiments. Vera to clarify duration of overall solar corona campaign and required minimum daily duration.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : figure 2.2.2-1 figure 2.2..2-2	Importance : Minor
Synthesis of the Comment : **Distance of 2.5 AU menitioned in text, distances below 0.7 AU depicted in graph.**	RID Identification : ESOC 12 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : Maximum distance is 1.7 AU. Minimum distance for parallel S-band and X-band operation is 0.7 AU. No S-band below 0.7 AU.	Reviewer Recommendation : VeRA to correct graph and text.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : 2.6.2.6	Importance : MAJOR
Synthesis of the Comment : **TRANSMISSION POWER AND NADIR POINTING IN PARALLEL.**	RID Identification : ESOC 13 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : Duration and precise attitude unclear. Operation of antenna in nadir pointing not (yet) part of spacecraft baseline attitudes. Power and thermal control may be critical.	Reviewer Recommendation : VeRA to define in detail duration and attitude of bistatic radar.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : 2.6.2.6 table 4.1.4-2	Importance : MAJOR
Synthesis of the Comment : **LINK BUDGET IS GIVEN FOR X-BAND ONLY** **TABLE 4.1.4-2 REQUIRES S-BAND AND X-BAND** **7.3.4.3.1: S/C WILL TRANSMIT A ONE-WAY X-BAND DOWNLINK DRIVEN BY THE USO.**	RID Identification : ESOC 14 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : Is S-band and X-band required for bistatic radar? Is X-band only possible? Is S-band link budget sufficient? (distances > 0.7 AU)	Reviewer Recommendation :VeRA to clarify use of S-band and link budget for bistatic radar. Provide operational plan for actual Venus orbits without contradictions.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : table 4.1.4-1/3 figure 4.1.4-5/6/7 table 7.1.4-1	Importance : MAJOR
Synthesis of the Comment : **AT LEAST 4 DIFFERENT ATTITUDES OR SLEW RATES ARE REQUIRED FOR VERA OPERATION.**	RID Identification : ESOC 15 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : VeRA required attitudes are not part of the baseline attitudes in the Venus Express offer. Thermal and power problems to be expected for the spacecraft. Strong influence on operational concept, especially in connection with a 24 h orbit. Switch to USO and ONED required after entry into occultation? S-band uplink required for bistatic radar? (table 7.1.2-1 requires no S-band uplink at all.)	Reviewer Recommendation : Clarify. VeRA to take into account actual Venus orbit. VeRA to detail slew rates and attitudes and experiment durations.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : 7.1.2-1 table 7.1.3-1	Importance : Minor
Synthesis of the Comment : **TWOS is compatible with use of Cebreros ground station. Experimental use of this mode is unclear.**	RID Identification : ESOC 16 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : TWOS could in principal be used in apocentre of 24 h orbit. Is there an operational use for X-band TWOS?	Reviewer Recommendation : Clarify.
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN

R.I.R. REVIEW ITEM DISCREPANCY

Title of Document : Reference of Document : PID-B VEX-VeRA-IGM-3001/PID-B	Instrument / Experiment ***VERA***
Section and Page of Document : Paragraph 7.1.6.3	Importance : Minor
Synthesis of the Comment : **Required accuracy is "highest feasible".**	RID Identification : ESOC 17 Reviewer ID : RT Domain ID : OPS
Reviewer Comment or Question : It is assumed that the orbit information will not exceed the accuracy that is anyway required for operational purposes. Why is information required on thruster firing times?	Reviewer Recommendation : Clarify. (In case of a quantitative high accuracy requirement the feasibility and the required effort at ESOC needs to be investigated.)
P.I. or E.M. Answer :	Reviewer Comment on Answer : Reviewer Position wrt Answer : Closed / or / OPEN

Board Comment :	Board Recommendation : No action / or / ACTION Board Position wrt RID Closure : Closed / or / OPEN